2011 Guidebook

Which Reclamation water contractors should use this guidebook?

The preparation of a Water Management Plan is required by applicable CVP water service contracts, settlement contracts, repayment contracts, or any contracts that specifically invokes the Standard Criteria for Evaluating Water Management Plans (Criteria).

Exceptions: The following are exempt from preparing a Plan using the Criteria:

- All contractors that receive **only** irrigation water from any Federal Reclamation project, and deliver water to less than a current five-year average of 2,000 acres of land.

- All contractors that receive less than a five-year average of 2,000 acre-feet per year (AFY) of **only** municipal and industrial (urban) water from any Federal Reclamation project.

- All contractors that receive any combination of irrigation and/or urban water amounting to less than a current five-year average of 2,000 acre-feet from any Federal Reclamation project.

- Sacramento Settlement Contractors who have prepared a Regional Water Management Plan in accordance with the 2004, Regional Criteria for Evaluating Water Management Plans for the Sacramento River Contractors.

Section I: Description of the District

A. History

Provide district contact information and give a one page or less historical overview of the district. Record significant historical events leading to the current state of the district and identify trends that appear likely to influence the district's future.

Enter the following information in Section I of the Plan Format (Chapter 4 of the Planner)

1. Date district formed and original size

Enter the date that the district was legally organized. Enter the date of the first contract with Reclamation. Enter the original size of the district in acres. (There are 640 acres in a square mile). Enter the current year (i.e., the last complete calendar year). This will be the year of the data entered in the Plan and Tables.

2. Size, population, and irrigated acres

For the current year, enter the current size of the district (acres), urban population served (receives treated drinking water), and irrigated acres served.

3. Water supplies received

Enter the amount of water (in acre-feet) received by the district during the current year. Enter the actual amount of water received from each of the listed sources. This information will correspond with the data found in the indicated Water Inventory Tables (Chapters 5 – Ag Tables and 6 – Urban Tables) in the Planner.

- Federal Urban Water (Table 1) – Water that is provided for Municipal and Industrial (M&I) use.
- Federal Agricultural Water (Table 1) – Water that is provided for agricultural use.
- State Water (Table 1) – Water from the California State Water Project.
- Other Wholesale (Table 1) – For example, water purchased from Santa Clara Valley Water District.
- Local Surface Water (Table 1) – Santa Barbara's Gibraltar Reservoir is an example.
- Water Transfers Entering the District (Table 1) – The amount of water the district purchased or traded .
- Upslope Drain Water (Table 1) – Drain or spill water that leaves the district service area and is used outside of the district service area (applies only to agricultural districts).
- District Groundwater (Table 2) – Groundwater that the district pumps and supplies to customers through its distribution system.
- Water Transfers Leaving the District (Table 6) – The amount of water the district sold, or traded out of the district.

- Recycled Water (Table 3) – The amount of treated urban wastewater provided to district customers.
- Other Water (Table 1) – desalination water, etc.

4. Annual entitlement under each right and/or contract

Provide information on the district's entitlement or contractual amount from each source (Reclamation, SWP, groundwater from adjudicated basins, drain water contracts, long-term transfer agreements, etc.). Please include each contract's identifying number and any contract restrictions that affect the district's water management. Examples of restrictions include time of delivery or amount of water available per month. Add rows to the table as necessary.

5. Describe anticipated land-use changes

Address land use changes (e.g., agricultural to urban, etc.) that may affect water use type or quantity due to possible, proposed, or current-zoning changes. Such changes might include: land annexation, increasing urbanization, or changes to the area's General Plan.

6. Cropping patterns (Agricultural only)

For agricultural districts describe the changes in irrigated acreages, cropping patterns, and evolving irrigation methods. Identify crops that are grown on 5 percent or more of the district's irrigated acreage and provide the total number of acres for each of those crops. If there are a number of crops grown on small acreage, combine them into one group, and list the combined acreage on the Other (<5 percent) row in the table. Detailing this information for the periods identified in the table provides a perspective on how the district's mix of crops is changing. A crop list is provided in Addendum D. Add rows to the table as necessary.

7. Major irrigation methods (Agricultural only)

List the major irrigation methods used on most acreage within the district for each of the specified years. Combine the acreage of the other irrigation methods into one group and list the combined acreage on the "Other" line in the table. Quantifying this information for the periods provided in the table gives the reader perspective on how the district's mix of irrigation methods is changing. Add rows to the table as necessary.

B. Location and Facilities

Attach maps depicting district facilities including: incoming flow locations (turnouts), conveyance system (identify pipelines, lined and unlined canals, etc.), outflow (spill) locations, storage facilities, regulating reservoirs, district wells and lift pumps, groundwater facilities, etc. Provide as Attachment A to your Plan.

1. Incoming measurement methods and locations

Identify each incoming flow to the district (use the same names as shown on the facilities map

and provide a physical location description), type of measurement device (flume, weir, propeller, acoustic, venturi, magnetic), and accuracy.

2. Current Agricultural Conveyance System

Enter the length (i.e., 1.2 miles) of unlined and lined canals and laterals, pipe, and other types of distribution facilities (such as natural channels).

3. Current Urban Distribution System

Enter the length (i.e., 1.2 miles) of asbestos concrete, steel, and cast iron pipe in the distribution system. Combine the total length of other types of pipes (i.e., plastic) in the "Other" category.

4. List storage facilities

Identify district storage facilities (use same names as shown on facilities map), including volume. Include tanks, reservoirs, etc.

5. Describe agricultural spill recovery system

Describe the district's spill recovery system – where and how distribution system spill water is collected and where it is re-used. Include outflow locations on the facilities map.

6. Agricultural delivery system operation

Describe how agricultural customers schedule water deliveries from the district. Identify whether the delivery system provides water:

a. on demand (i.e., no lead time or scheduling is necessary)
b. scheduled (i.e., customer requests start time, flow rate and quantity)
c. on a rotation basis (i.e., customers get water every 10 days)
d. some combination of methods

7. Describe restrictions on the district's water source(s)

If the district's water supplies are constrained in some manner that limits water management and operations, explain. Restrictions might limit the amount of water or time of use. The cause of a restriction might be a contractual or physical limitation. Include information about operational constraints the restrictions impose on water management. Examples of operational constraints include receiving surface drainage from an upslope district with no control over quantity or timing, or the inability to supply the quantity of water needed by the growers due to insufficient canal capacity.

8. Describe proposed changes or additions to district's facilities and operations for the next 5 years

Examples include changes to service area, lining/piping of existing canals, and installation of measurement devices with improved accuracy, etc.

C. Topography and Soils

1. Describe topography of the district and its impact on water operations and management

Describe the topography (e.g., hilly, flat, sloping to a watercourse) of the district. Discuss any impact of topography on district's water management. An example of a topography impact would be if lower sections of a gravity piped water distribution system have excessive pressure while upper portions of the system have inadequate pressure. Topography also affects drainage capture and reuse.

2. Describe district's soils associations (Agriculture only)

Provide district's soil associations. A Natural Resources Conservation Service (NRCS) general soils map of the district service area will generally be the clearest way to present soils information. Include in Attachment A.

Where can soil classification information be obtained? http://www.nrcs.usda.gov/.

The NRCS has soil survey information for most agricultural regions in California. Recent surveys (within the last 25 years) contain a single map called the "General Soil Map." These maps group soils into what are called soil associations and are appropriate for this Plan. Soil groupings are made according to soil characteristic similarities, such as texture, depth, salinity, slope, flooding potential, impervious layers, etc. An awareness of these soil groupings can help target BMP programs - such as in areas where distribution canals might have high seepage rates or in areas of tailwater quality problems. Reclamation's soil classification system is based on projected economic return from different classes of soils and is NOT appropriate for this Plan.

3. Describe limitations resulting from soil problems (Agriculture only)

Describe any limitations resulting from soil problems (e.g., salinity, high water table, high or low infiltration rates, etc.) within the district. If the district provides water to an area that has a high water table or other water or drainage related problem, identify the problem, number of acres with that problem, and what impact the problem has on water use. District staff and customers will have knowledge of soil limitations and the resulting impacts on water management. For instance, crops grown on poor soils may require more water than crops grown on good soils. If the district can identify terrain and soils that use more than average amounts of water, these areas can be targeted for improved management programs.

D. Climate

1. Describe the general climate of the district service area

Describe the general climate of the district (available from the National Weather Service, etc.). Local newspapers or weather service companies may also provide a concise description of local weather patterns. For weather data, specify the period of record (30 years recommended) and reference (weather station) used. Historic weather data from the National Weather Service climatological stations provide all the requested data. Identify which station you selected and which years of data were available. The web site address is: www.wrcc.dri.edu/summary/climsmnca.html.

2. Impact of any microclimates on water management within the district

Where appropriate, relate climate to water use. Are there special microclimates in the district that require more (or less) water due to factors such as excessive wind or frost? The impact of climate may be similar to the impact of soil and terrain.

E. Natural and Cultural Resources

1. Identify natural resource areas within the district

Describe any known natural resources (wetlands, rivers, streams, lakes, etc.) within the district. Indicate if any of these resources were managed (past or present) by the contractor. A layer on your district facilities map (Attachment A) may be the clearest way to provide this information.

2. Describe management of these resources in the past or present by the district

If the district provides water to natural resource areas or manages them, describe the district's role. Describe how district staff work with the U.S. Fish and Wildlife Service, NRCS, U.S. Army Corps of Engineers, or the California Department of Fish and Game to identify natural resource areas and threatened and endangered species in the district.

3. Identify recreational and/or cultural resource areas

Identify and describe recreational and/or cultural resource areas and size of each in acres. Examples of recreational resources are sites used for rafting, boating, water skiing, and fishing. Examples of cultural resources are structures listed on the National Register of Historic Places, Native American archeological sites, or other sites of historic significance. Indentify areas on a map in Attachment A as necessary.

F. Operating Rules and Regulations

1. Attach a copy of the district's operating rules and regulations

Attach only the rules and regulations that apply to water supply and use. Provide as Attachment B.

Note: If the district supplies no agricultural water, write "No Ag" in Section I.F.2 to F.4 and skip to Section I.F.5.

2. Describe the district's agricultural water allocation policy (Agriculture only)

Describe the district's agricultural water allocation policy, including the district's policy on allocations in times of shortage or drought. Identify the page number(s) of the relevant sections in the district's rules and regulations that were included as Attachment B.

3. Describe official and actual lead times necessary for water orders and shut-off (Agriculture only)

Describe the water ordering system. Identify the page number(s) of the relevant sections in the district's rules and regulations that were included as Attachment B. Describe any differences between actual operations and the official rules, such as water delivery orders being filled in 12 hours when the rules say 24 hours is the minimum.

4. Describe the district's policies regarding return flows (surface and subsurface drainage from farms) and outflow (Agriculture only)

Describe how the district deals with surface and subsurface drainage and outflow. Identify the page number(s) of the relevant sections in the district's rules and regulations that were included as Attachment B.

5. Describe the district's policy on water transfers by the district and its customers

Describe the district approach to water transfers within and between districts. Identify the page number(s) of the relevant sections in the district's rules and regulations that were included as Attachment B.

G. Water Measurement, Pricing, and Billing

Accurate water delivery measurement is an effective water management tool. When both the water user and the district are aware of quantity, timing, and location of water use, refinements can be made to improve water management and reduce water waste.

Note: Section I.G.1 below addresses districts who serve agricultural customers and I.G.2 addresses districts who serve urban customers.

1. Agricultural Customers

A turnout is a water delivery point. Farms may have multiple water delivery points. All turnouts have some method of controlling water flow, but measured turnouts are those which can accurately measure the quantity of water delivered (under most conditions within +/- 6 percent).

a. Provide total number of delivery points (turnouts and connections)

The point at which water leaves the district delivery system and enters the customer distribution system is the delivery point.

b. Provide total number of delivery points serving more than one farm

This is when the district has delivery points at which water leaving the district delivery system can enter two or more separate farm distribution systems. In this situation the customers are often responsible for determining how much water each of them receives.

c. Provide total number of measured delivery points.

A measured delivery point is one with a device that is operated and maintained to a reasonable degree of accuracy (under most conditions within +/- 6 percent). Three categories of measurement devices that may meet this criterion are devices with totalizers, standard flow measurement devices, and non-standard but calibrated devices.

d. Provide percentage of delivered water that was measured at a delivery point.

Provide the percentage of delivered water that was measured at a delivery point under most conditions within +/- 6 percent.

e. Provide total number of delivery points not billed by quantity.

Provide the total number of delivery points where delivered water is not billed by quantity.

f. Complete measurement device table.

Provide the number of each type of measurement device used by the district, the accuracy of that type of device (along with documentation verifying the accuracy of the devices), how often the device is read, and the calibration and maintenance schedule. The accuracy of the district's measurement devices may have been determined during installation, but periodic calibration is necessary to maintain accuracy. For the various devices, provide the maintenance interval that the district has determined necessary. See Chapter 9 for information on the Calibration and Maintenance of Measurement Devices. Documentation verifying the accuracy of measurement devices must be submitted with the Plan and included as Attachment C. Refer to Chapter 10 for an example of acceptable documentation procedures.

2. Urban Customers

a. Provide total number of connections

Determine the number of connections at which water leaves the district delivery system and enters a separate distribution system. For instance, a city park may have one or more connections.

b. Provide number of metered connections

Determine the number of connections that have installed meters. Connections with meter boxes but no meters are not metered connections. All connections have valves to control water flow, but measured connections also have meters.

c. Provide number of connections not billed by quantity

Determine the number of connections that are billed by quantity of water flowing through the meter. A city park which has a meter but which is not billed for water use is not billed by quantity.

d. Provide the percentage of water that was measured at delivery point

This will require an estimate of the amount of water provided to unmeasured accounts.

e. Provide the percentage of water that was billed by quantity

Some cities do not bill city departments (parks, sanitation, etc.) for water use. The quantity of water delivered but not billed should be determined and calculated as a percentage of the total.

f. Complete measurement device table

Provide the number of each size of displacement meters used by the district, the accuracy of those meters, how often the device is read and the calibration and maintenance schedule. Identify the number of other types of meters (turbo, compound, etc.), size, accuracy, reading schedule and the calibration and maintenance schedule

The manufacturer has determined the accuracy of their meters, but periodic calibration is necessary to maintain accuracy. For the various devices, provide the maintenance interval that the district has determined necessary. Add rows to the table as needed.

3. Agricultural and Urban Rates

a. Describe the district's current year agriculture and/or urban water charges.

Describe the district's current year urban and/or agricultural water charges, including dollar amounts for fixed/stand-by fees and quantity charges. Describe the rate structure for urban water

deliveries (flat rate, tiered rate, seasonal rate, etc.). Describe billing frequency and bill format.

Attachment B, Rules and Regulations should contain the current year water charge ordinance. Identify the page number where the current year rate ordinance can be found in Attachment B.

b. Annual charges collected from customers (current year data).

For fixed charges, identify the current year charge for each unit (per acre per year, 1" monthly meter charge, etc.) and how many units were billed during the current year (acres, 1" meters times 12 months, etc.). Include the total dollar amount collected from each charge.

Complete this table for the current year and provide District Sample Bills as Attachment C.

For volumetric charges, identify the current year charge for each unit (per AF, per HCF in tier 1, tier 2, etc.) and how many units were billed during the current year (AF, total HCF sold in tier 1, tier 2, etc.). Include the total dollar amount collected from each charge.

c. Describe the contractor's record management system

Describe water use data accounting systems and procedures. Typical systems include standard computer software, contractor specific software, and ledgers. The description of the accounting procedures should document how customers access their water use history and how many years of historic data are available to them. Attachment D should contain examples of actual bills (for each customer category) and discuss how they provide customers with current water use data, comparative annual use data, and pricing signals.

H. Water Shortage Allocation Policies

1. Attach the district's current year water shortage policies.

Include the district water shortage allocation plan as Attachment E. It should detail how reduced water supplies will be allocated. If the district has different policies for various customer types (e.g., agricultural or urban), attach both plans.

Districts that deliver more than 2,000 AF of water are encouraged to have a water shortage contingency plan. To develop an urban Water Shortage Plan, assistance is available from DWR at www.owue.water.ca.gov/urbanplan and from Reclamation at www.usbr.gov/mp/watershare/. For assistance developing an agricultural water shortage plan, contact your local area office.

2. Attach the district's current year policies that address wasteful use of water.

Identify rules and regulations that address wasteful use of water. Include information on enforcement methods. Identify the page number(s) of the relevant sections in the district's rules and regulations that were included as Attachment B.

I. Evaluate Policies of Regulatory Agencies Affecting the Contractor and Identify Policies that Inhibit Good Water Management

Evaluate policies of agencies that provide the contractor with water. Water projects (CVP, SWP, etc.) and wholesale water agencies provide water based on policies that sometimes make retail water management more difficult. For instance, policies that require payment for unused entitlement, or that limit carry-over of unused water, can encourage unnecessary water use. Discuss possible modifications to policies and solutions for improved water management. As an example, several water districts, through negotiations with Reclamation, were able to change their water year so that the end of the water year could coincide with the end of the rainy season. Now their customers are better able to manage their water supplies to take advantage of effective precipitation.

Section II: Inventory of Water Resources

Note: If the requested information is not available, describe how that information will be obtained for the next Plan revision or state that the information is historical and cannot be reconstructed.

This section shall include a description of contractor's surface water supply, groundwater supply, other water supplies, source water quality monitoring programs, water uses within the district, outflow from the district, urban wastewater disposal, and water budget. Provide this information for either the last complete calendar year or the last complete water year prior to preparation of each five-year Plan update. Indicate which data set(s) are used for preparing the Plan.

A. Surface Water Supply

1. Acre-foot amounts of surface water delivered to the district by each of the district's sources.

In Table 1 of the Water Inventory Tables, quantify all district surface water supplies. Specify the type of water (e.g., urban, agricultural, Class 2, spill, etc.) and the quantity of each delivered to the district by month. If you do not receive State water, local surface water, or other surface water then leave those columns blank. In Table 8, quantify the amount of each type of surface water the district received in each of the last 10 years. If the district has sources of surface water that are not listed in the table, add the necessary columns.

B. Groundwater Supply

1. Acre-foot amounts of groundwater pumped and delivered by the district.

Quantify district groundwater supplies in Table 2. Specify the monthly amount of groundwater pumped by the district. The "Pumped by Customers" column asks only for an estimate of private groundwater pumping – either by month or year. If the district and/or private parties do not pump groundwater, leave these columns blank.

2. Groundwater basin(s) that underlie the district.

Information necessary to describe groundwater basins can be found in California DWR Bulletin 118 at http://www.water.ca.gov/groundwater/bulletin118/bulletin118update2003.cfm. This comprehensive report on California's groundwater describes the general boundaries of each groundwater basin. It identifies which basins are subject to overdraft as well as describing areas of potential ground water storage. You can use this Bulletin to identify the groundwater basin(s) that underlie the district boundaries and the size, usable capacity, and safe yield of the basin(s). A large groundwater basin may underlie several districts. In a few cases, districts overlie more than one groundwater basin.

3. Map of contractor operated wells and managed groundwater recharge areas.

The Plan should provide a map of the district that locates district groundwater wells and any managed groundwater recharge areas. Include in Attachment A.

4. If there is conjunctive use of surface and groundwater, describe it.

Information necessary to adequately describe groundwater conjunctive use programs includes:

a. Determination of the groundwater quality (i.e., is the groundwater quality adequate for direct use or is blending required?).
b. The amount of groundwater storage capacity currently available and how much additional storage could be available by extracting groundwater for use.
c. The location of existing and potential recharge sites (spreading basins, in-stream, or injection wells) and identification of the soil types and resulting recharge rates.
d. Determination of hydraulic continuity between the possible recharge and extraction areas.
e. Identification of possible sources of recharge water and the quantities, qualities, and period of availability for each source.
f. For districts without district-owned wells, describe how the district receives compensation from the beneficiaries of the recharged groundwater.

5. For managed groundwater basins, attach a copy of the management plan.

If the district or its customers use groundwater from a managed or adjudicated groundwater basin, attach a copy of the Plan (Attachment F).

6. For participation in groundwater banking, attach a description of the banking agreement.

If the district participates in groundwater banking, attach a description of when and how much water was banked, and when and how much is available for retrieval (Provide a copy of the banking agreement (Attachment G).

C. Other Water Supplies

Acre-foot amounts of "Other" water used as part of the district's water supply.

Indentify and quantify all surface and groundwater supplies in Tables 1 and 2. For instance, desalinated or Class 2 water that was delivered during the current year should be included as part of the year's water supply. Quantify long-term "Other" water supplies in Table 1 and define in the column title.

D. Source Water Quality Monitoring Practices

1. Potable Water Quality (Urban only)

Attach the District Annual Potable Water Quality Report (Attachment H that is mailed to all customers. This report provides information on the quality of each of the district's water sources. If there are water quality concerns and/or problems, describe how they affect the district's water treatment process and its customers.

2. Agricultural districts.

Indicate if the district has any surface or groundwater quality issues that affect customer-use decisions. If there are water quality concerns and/or problems, describe the quality problems and how they affect the water's use.

3. Description of the water quality testing program and the role of each participant in the program.

Describe the water quality testing program including which agencies are involved, the contractor's role, and how the program is funded.

4. Current year water quality monitoring programs.

For surface water, identify the analyses performed, the frequency of the tests and the results (concentration range and average).

For groundwater, identify the analyses performed, the frequency of the tests and the results (concentration range and average).

If there are no water quality issues, enter N/A.

E. Water Uses within the District

1. Agricultural

In the Water Inventory Tables, Chapter 5 Table 5, list the crops grown in the district (use the crop list provided in the Addendum D). For each crop, list the irrigated acres of the crop, seasonal crop ET, leaching requirement, water used for cultural practices (frost protection, pre-irrigation, etc.), and effective precipitation. The spreadsheet formulas will combine these values to determine the total water demand (AF) of each crop. You may wish to combine crops grown on less than 5 percent of the total irrigated acreage. To combine crops, determine an average crop ET, leaching and cultural requirement, and effective precipitation for this group of small acreage crops. The crop ET and effective precipitation for crops in your area can be obtained from a report prepared by the Irrigation and Training Research Center (ITRC) at Cal Poly. *California Crop and Soil Evapotranspiration* can be accessed at

http://www.itrc.org/reports/californiacrop.htm. Another resource is the Center for Irrigation Technology's (CIT) Wateright web site at www.wateright.org. Crop ET can also be obtained from the DWR district office or the local Farm Advisor. Contact local UC Cooperative Extension County Farm Advisors at http://sfp.ucdavis.edu/research/coopextcontacts.html.

2. Types of irrigation systems used for each crop

List the crops grown in the district and how many acres of each type of irrigation used on each crop. The types of irrigation systems used on each crop can help the district target customer assistance programs, workshops, and educational materials. If the district collects information from district farmers for a yearly crop census or Reclamation Crop Report, information can also be requested on the number of acres of different irrigation systems used on each crop. Expanding an existing report will minimize district and customer cost and paperwork. Use the seven general irrigation system types – basin, furrow, sprinkler, low-volume, drip, microsprinkler, and combination (sprinkler and furrow, etc.).

3. Urban

Quantify the number of connections and yearly water use for each of the following customer account types:

a. Single-Family - a connection that serves a single detached residence.
b. Multi-Family - a connection that serves a building containing multiple dwelling units or an individual unit in a building containing multiple units.
c. Commercial – a connection that serves businesses that provide or distribute a product or service, such as hotels, restaurants, office buildings, commercial businesses, or other places of commerce.
d. Industrial - a connection that serves primarily manufacturers or processors of materials.
e. Institutional - a connection that serves institutions dedicated to public service. This includes schools, courts, churches, hospitals, and government facilities. All public service facilities are to be considered institutional connections regardless of ownership.
f. Landscape Irrigation - a connection that serves an urban landscaped area.
g. Wholesale - a connection that provides water to a water agency.
h. Recycled - a connection that provides recycled urban wastewater.
i. Other- specify.
j. Unaccounted - the quantity of water that is treated but not sold - lost through leaks, breaks, slow meters, fire fighting, line flushing, etc.

4. Urban Wastewater Collection and Treatment Systems serving the district service area

Describe the wastewater collection and treatment systems serving the district service area. Include the level of treatment, quantity of water treated, and place of disposal of the treated water. Contractors that do not provide wastewater treatment services should request this information from the wastewater agency.

a. Waste treatment plant - provide the names of the wastewater plants serving the district

service area.
b. Treatment level (primary, secondary, tertiary) - if there are different treatment streams, quantify the AF treated for each level during the current year.
c. Disposal to - identify where the treated wastewater is discharged (e.g., ocean, river, percolation ponds, etc.) and how the recycled water is used (e.g., landscape, toilet flushing, etc.)
d. Total discharged to ocean/saline sink - quantify the AF discharged to these areas during the current year.

5. Groundwater recharge/management/banking

Identify contractor operated groundwater recharge areas (as identified in Section II.B.). List the quantity of water used for planned groundwater recharge, including method of recharge and retrieval. The quantity listed will correspond to the data provided in Water Inventory Table 6.

A groundwater recharge program uses surface water to recharge a groundwater basin for later withdrawal or provides surface water to farmers that normally pump groundwater (in lieu of recharge) so that the groundwater is left in the ground. Describe each recharge location with respect to soil type, method of recharge, percolation or injection rate, and hydraulic continuity with the extraction areas. Include the AF recharged in the current year. Do not include incidental recharge, such as canal seepage or deep percolation resulting from excess irrigation, unless data relating to the above points has been developed.

If you participate in a defined groundwater banking system, describe it here or attach a description. In order to participate in a groundwater banking program, water must be able to be withdrawn at a later date. Describe how water that was percolated into the ground will be withdrawn for district or customer use.

6a. Transfers and exchanges into the district service area

Describe the source and quantity of water in any transfer, trade, exchange, carryover water, rescheduled water, purchase or sale, **into** the district. Provide the following information for the current year: from whom to whom, AF of each transaction and use. This information will correspond with the data you provide in Water Inventory Table 1. Information on transfers and exchanges within the district is not requested. Transfers refer to water exchanges, sales, or other agreements that transfer or exchange water between water districts or users, such as:

a. Agriculture to urban
b. Urban to agriculture
c. Agriculture to agriculture
d. Urban to urban
e. Agriculture to refuges
f. Urban to refuges

6b. Transfers and exchanges out of the district service area

Describe the source and quantity of water in any transfer, trade, exchange, rescheduled to another year, purchase or sale, **out** of the district. Provide the following information for the current year: from whom to whom, AF of each transaction and use. This information will correspond with the data you provide in Water Inventory Table 6.

7. Wheeling or other transactions

List wheeling or other transactions not covered above that involve moving water out of the district. An example is water that is either moved into a groundwater bank or extracted and returned to the district from a groundwater bank. Provide the following information for the current year: from whom to whom, AF of each transaction and use. This information will correspond with the data you provide in Water Inventory Tables 1 and 6.

8. Any other uses of water

If there were other uses of water not covered above, describe them (e.g. water for hydroelectric power, water used to meet water quality objectives, emergencies, environmental deliveries, etc.) and the quantities involved.

F. Outflow from the District (Ag only)

1. Provide a description of each outflow point (shown on the facilities map, Attachment A) and include the quantity of outflow, the type of measurement and percent accuracy, the acreage of land drained, and where the outflow water goes. For example, if the district surface return flow is discharged into the Sacramento River, the Plan should state that irrigation runoff and operational spills are returned to the Sacramento River. In this case, specific downstream uses would be unknown.

2. If the district conducts, participates, or funds any part of a drainage-testing program, describe those activities. Provide a description of the outflow drainage and spill water quality testing program, the outflow subsurface drainage water quality testing program and the role of each participant in the program. Identify any constituents (selenium, pesticides, salinity, etc.) that limit reuse of the outflow water and how. If available, attach a copy of your State Water Resources Control Board summary water quality report prepared under a current Ag Waiver.

3. Enter the type of analysis and the results performed on the outflow water. If the district has no surface or subsurface drain water, state "None" and leave the rest of this section blank.

4. Provide a brief discussion of the District's involvement in Central Valley Regional Water Quality Control Board programs or requirements for remediating or monitoring any contaminants that could significantly degrade water quality in the receiving surface waters.

Districts included in the drainage problem area, as identified in "A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990)," are required to complete Water Inventory Table 7 in Chapter 5 and

Addendum C (include in Plan as Attachment K)

G. Water Accounting (Inventory)

Develop a water inventory, (using the accompanying spreadsheet developed in Excel format), for the contractor based on the last calendar year or the last water year prior to preparation of each five-year Plan revision. Indicate which dataset(s) is used for the inventory. The intent of the water inventory is for districts to quantify water supplies, uses, losses within the district and outflow.

Knowledge of the amount of water used for various purposes can lead to improved water management. A water inventory also identifies where a district lacks information. When analyzing BMPs, the potential and actual water savings resulting from an individual practice can be estimated based on the water inventory. Completing Tables 1 through 8 provides all the water inventory data. Refer to Chapter 5 for Ag tables and Chapter 6 for Urban tables.

1. Quantify district water supplies

To complete this section, enter the necessary data in the listed tables.

a. Surface water supplies, imported and originating within the district, by month (Table 1, completed in Section II.A.). Quantifying surface supplies by month will allow districts to show what supplies are used to meet water demands (including groundwater recharge).

b. Groundwater extracted by the district, by month (Table 2, completed in Section II.B.).

c. Effective precipitation by crop (Table 5). Information may be found at www.fao.org/DOCREP/X5560E/x5560e03.htm. The district will have to calculate this information based on when the crop was planted, the soil moisture profile and precipitation patterns and intensity. Information is available from ITRC and CIT (see p. 3-15 for web sites). DWR district office staff or local County Farm Advisors may also have information on the effective precipitation amounts for the crops grown in your district.

d. Estimated annual groundwater extracted by non-district parties (Table 2, completed in Section II.B.). If records are not available, provide an estimate and basis for estimation. Urban water wells are usually metered, and the information is generally available by contacting the pumpers. If the district does not have groundwater production records for private agricultural groundwater pumpers, use the following method to estimate the quantity pumped:

- (water needed for crop ET) + (water needed for leaching) - (effective precipitation) = crop water need
- (crop water need)/(irrigation efficiency) + (system losses) = estimate of applied water
- (estimate of applied water) - (amount of water delivered by the district) = estimate of private groundwater pumped

A similar method can be used to estimate the private urban pumping.

e. Recycled water, by month (Table 3, completed in Section II.E.2.). Recycled water is

urban wastewater that is treated and available for reuse.

f. Other supplies, by month (Table 1). To be defined by the district. Possible other sources of water include, but are not limited to: water transfers into the district or small miscellaneous flows.

2. Quantify water used

To complete this section, enter the necessary data in the listed tables.

a. Conveyance losses, including seepage, evaporation, and operational spills from canals; and leaks, breaks, fire, and flushing from pipes (Table 4). Types of canal losses include seepage, evaporation, and operational spills. Losses from piped distribution systems results from leaks, breaks, flushing, and fire fighting.

Canal seepage is the most difficult to calculate. Seepage from unlined canals is related to soil properties and can change over time, thus calculating the rate of loss per section requires ponding tests, accurate metering, or another similar method. Evaporation may be calculated by determining the surface area of the canals and regulating reservoirs and applying the local evaporation rate. Operational spills may be calculated if the end of the canal has a weir or other measurement device of suitable accuracy. Describe how conveyance loss values were determined or estimated. See the Canal Lining and Reservoir Lining documents in Chapter 11 for reference.

Conveyance seepage is considered a loss of irrigation water, and sometimes, groundwater recharge. For example, when the Friant Unit's Class 2 water is available, conveyance seepage in some cases may be considered a groundwater recharge method. However, when water intended for irrigation is conveyed, seepage often results in increased pumping costs and degraded water quality. Practices that reduce seepage can help districts use water more efficiently, but may require new methods and locations for groundwater recharge.

Losses from urban distribution systems can be calculated by conducting a system water audit. The AWWA Water Audit Manual web site has complete instructions, worksheets, and examples.

b. Consumptive use by riparian vegetation (Table 6). Estimate the annual consumptive water use by riparian vegetation inadvertently or intentionally provided with district water. Do not include riparian vegetation located at an environmental or recreational resource. Estimate the total acres of incidental riparian vegetation and an overall use (based on ET during the months when water is available) to obtain an estimate of consumptive use. Information may also be available from local County Farm Advisors and neighboring districts.

c. Applied irrigation water, crop ET, water used for leaching and for cultural practices (e.g., frost protection, soil reclamation, etc.) (Table 5). This section quantifies crop water need. Crop water need includes crop ET and water used for leaching and cultural practices. One good resource is available at

www.fao.org/DOCREP/003/T0234E/T0234E02.htm. Determine the total crop water need for each crop. The crop ET and effective precipitation for crops in your area can be obtained from a report prepared by the Irrigation and Training Research Center (ITRC) at Cal Poly. *California Crop and Soil Evapotranspiration* can be accessed at http://www.itrc.org/reports/californiacrop.htm. Another resource is the Center for Irrigation Technology's (CIT) Wateright web site at www.wateright.org. Crop ET can also be obtained from the DWR district office or the local Farm Advisor. Contact local UC Cooperative Extension County Farm Advisors at http://sfp.ucdavis.edu/research/coopextcontacts.html.

d. Urban water use (Table 6). Determine total water sales and other authorized uses. Do not include losses, fire fighting, and system flushing, as these were included in Table 4, Distribution System Losses.

e. Groundwater recharge (Table 6).Quantify water used by the district for the purposeful recharge of groundwater, including recharge ponds and water injected for recharge. Purposeful groundwater recharge is a program that determines when and where the water will be recharged and extracted – not just general deep percolation of surface water.

f. Water exchanges and transfers (Table 6). Quantify water transfers outside the district service area. If your district is reporting transfers out of the district, this will be a negative number. Do not include water transfers into the district as these were included in Table 1 and Table 8.

g. Estimated deep percolation within the district (Table 6). Deep percolation is usually estimated as the difference between applied water (minus any runoff leaving the district) and crop water use. Some deep percolation may be necessary for leaching. Excess deep percolation is considered an economic loss since unneeded groundwater is purchased, groundwater quality is degraded and energy is used for unnecessary pumping. Water applied for intentional recharge is not deep percolation. Table 6 calculates an estimate of the current year's deep percolation.

h. Agricultural flows to perched water table or saline sink (Table 7). Calculate, or if necessary, estimate the amount of deep percolation or drainage that flows to a saline sink (the ocean, Kesterson, etc.) or to a perched water table (within 5 feet of the soil surface).

i. Agricultural irrigation drain water leaving the district (Table 6). Calculate, or if necessary, estimate the total outflow leaving the district.

j. Other (Table 6).Quantify any other uses of water within the district. Include in the non-agricultural or non-urban row. This may be incidental urban use in an agricultural district or incidental agricultural use in an urban district.

3. Overall water inventory

Compare total water estimated to be available for sale within the district with the total water actually sold by the district (Table 6). Table 6 compares total water available for sale with total water sold. This water budget inventory can be used to identify areas where water management

could be improved and thus helps the district to select and implement appropriate BMPs. Evaluation of several of the BMPs in Sections 3 and 4 requires an estimate of how much water may be conserved by each practice. Parts of this process are imprecise. However, the inventory process will help the district to estimate the amount of potential water savings and the costs of achieving those savings.

Section III: BMPs for Agricultural Contractors

Any Contractor that provides water to 2,000 farmed acres or more must complete this section.

If a primarily Agricultural Contractor provides some Urban Water, they are required to include Urban BMP 1.3, (Utility Operations, Metering) in their plan.

Once a Contractor annually provides 2,000 AF of municipal and industrial water or more, they are required to address all the BMPs in Section IV, BMPs for Urban Contractors.

In this section, describe the water management program the district determines will best accomplish each BMP. The success of some of the practices will depend on cooperative work with other entities. Monitoring implementation activities and results will allow the district to modify planned programs that do not accomplish the practice as designed.

Some BMPs are considered universally applicable (critical) and others are considered generally applicable (exemptible). Under certain circumstances, one or more of the exemptible BMPs may not be appropriate for district implementation. The district will implement each exemptible BMP unless the district provides adequate documentation that supports an exemption or states the reason the BMP is not applicable in accordance with the exemption process (see Addendum A).

For each BMP, describe how the plan will be carried out, including actions and timelines, budgets, staff, and projected results (e.g., changes in water and energy use, improved water quality, improved yields, increased habitat). Identify how each BMP will be monitored to see if it is achieving the projected results.

A. Critical BMPs for Agricultural Contractors

Critical BMPs are those that every Reclamation agricultural district is required to implement. These BMPs are considered to be the basic elements of good water management. Select a program design for each critical BMP that will provide maximum benefit to the district and its customers.

1. Water measurement

Measure the volume of water delivered by the district to each customer with devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 6 percent. Three categories of measurement devices that may meet this criterion are devices with totalizers, standard flow measurement devices, and non-standard but calibrated devices.

The **first category** includes devices with totalizers that measure volume: Propeller meters, Venturi meters, magnetic meters, and acoustic meters. These have a high level of accuracy with proper installation and periodic maintenance and calibration.

The **second category** includes standard flow measurement devices that measure flow rate and also require accurate measurements of water level and delivery time to determine volumes: Replogle and Parshall flumes; rectangular, trapezoidal (Cipolletti), and V-Notch weirs; and canal meter gates. These devices require proper installation; continuous or sufficiently frequent recording of water levels and flow rates; delivery beginning and ending times; adjustments for approach velocity in some cases; and regular maintenance and calibration for good accuracy.

The **third category** includes non-standard, calibrated flow measurement devices. This category includes special measurement devices developed for a specific location. Typically, there are no published standard dimensions or flow tables for such devices. Consistent dimensions and installations; accurate determination of delivery time; local calibration and a verification of accuracy, based on a representative sample number of devices measured over time; and a proposed schedule for maintenance and calibration would be necessary for acceptability. This category also includes calibrated pumps when the suction side water level fluctuation is small when compared to the lift (+/- 6 percent) and the discharge pressure is not changed.

Refer to the Calibration and Measurement document, Planner, Chapter 9, for examples of installation, calibration, and maintenance of measurement devices that are described here.

Rough estimates of flow rate or volume, such as flow rate estimates at check structures, the sum of siphon tubes, or the use of occasional flow readings and multiplying by the time between readings (or other methods of measurement not specified here), are **NOT** acceptable as they do not provide a documented reasonable degree of accuracy. Estimates of flow rate or volume based on one moment of time and assumed continuous over a period of more than an hour are **NOT** acceptable.

Water measurement of each turnout has many benefits. When customers know how much water they use for incremental time periods (monthly, per irrigation, etc.), they are able to make informed economic decisions. The distribution system can be correctly sized and operated to provide the water quantities and timing that customers need. Contractor costs for pumping, canal maintenance, and drainage can be controlled. Measurement devices (meters, flumes, weirs, sonic, etc.) should be selected based on the characteristics of the district's distribution system, water quality, and delivery requirements. It is important to implement a maintenance and/or replacement program in conjunction with the installation program because measurement devices become less accurate over time. Contractors that measure deliveries can provide customers with their historic water delivery records. Customers can then determine what quantities of water were applied to crops in previous years and evaluate their irrigation systems and operations.

An example of a measurement program is one implemented by Westlands Water District. The District installed flow meters at each lateral when the district's water distribution system was originally constructed. Each of the 3,075 original agricultural deliveries cost $1,400, in 1991 dollars, for a total of $4.3 million. District-wide meter accuracy is within plus or minus two percent as determined from calibration tests. Westlands' Meter Shop, located at the District's Five Points Shop and Field Office, is one of state's most modern facilities. Meters are calibrated in the shop on a fixed schedule and repaired as needed. Meters that fail or are inaccurate are repaired and recalibrated immediately. To ensure accuracy, meters are placed on a four-year

preventive maintenance cycle ensuring that each is overhauled and recalibrated at least quadrennially.

Another example of a measurement program began in 2004, when the Solano Irrigation District implemented an Ag Meter Replacement Program which shares the meter and service conversion costs with the farmers. Since the original system was designed for flood or furrow irrigation, the agricultural services were constructed for high volume usage. As farmers converted their irrigation systems to drip or micro-spray systems, the original metered gate or propeller meter services did not accurately measure the lower flow rates. This program shares in the costs to convert the service to a low flow meter. This is accomplished by the farmer paying for only the material costs and the District paying for the labor and equipment costs including the engineering of the "new" service.

2. Designate a water conservation coordinator

Provide the job description and minimum qualifications. Job duties should include five-year plan preparation, implementation and annual updates. Include the coordinator's title, business address, business phone number, and business email address. For small districts, this could be a part-time responsibility. For larger districts, this may be a full-time responsibility with additional staff. If a consultant is hired to write this Plan, the district should designate a district staff member as conservation coordinator to manage the work and communicate with Reclamation. Reclamation offers workshops to assist with Plan development and will provide technical assistance to the district during Plan preparation and implementation. Upon request, Reclamation area office staff will meet with a district's conservation coordinator to assist with the preparation, implementation, and evaluation of the Plan.

3. Provide or support the availability of water management services to water users

Develop and conduct individual district-wide programs or collaborate with other contractors to develop cooperative, regional programs. Some contractors may want to arrange program delivery through consulting firms, cooperative extension, or other entities. Services required include, but are not limited to:

a. <u>On-farm evaluations</u>

    1. <u>On-farm irrigation and drainage system evaluations using a mobile lab type assessment</u>

The Criteria states that districts shall provide or support on-farm irrigation system evaluations for their customers. The BMP is intended to provide the water users with access to irrigation system performance information that will help them improve their irrigation systems and management. Water users may or may not take advantage of this service. The districts are not required to offer these services free of charge.

The following are examples of adequate programs:

- Offer to district water users a rebate/discount of 25 percent off the fair market price of an evaluation.
- Annually provide evaluations to at least 5 percent of the district water users requesting this service.
- Actively advertise a district organized evaluation program to district water users.

This can be accomplished by providing financial support to mobile lab programs, consultants, university students, or others who can perform the evaluations. The district shall also make all district water users aware of the service through newsletters, bill stuffers, or other district publications. If the district can demonstrate that at least 5 percent of district customers currently have systems evaluations annually, the district does not have to provide the service. The district is still expected to maintain support for this service by providing information to district customers.

On-farm irrigation system evaluations provide information that growers need to make efficiency improvements to existing irrigation systems. Irrigation evaluations, such as those being provided by mobile labs and other consulting services, identify correctable problems such as worn nozzles, insufficient filtration, incorrect or irregular nozzle sizes, excessive run time, etc. Also, evaluations often identify when and where over or under irrigation are occurring.
In the Plan, provide information on the number of farms and acres that are projected to receive irrigation system evaluations in each of the next 3 years. Include:

- Total number of irrigated acres
- Number of irrigated acres to be surveyed per year by on-farm irrigation evaluations
- Total number of farms
- Number of farms to be surveyed per year by on-farm irrigation/drainage evaluations.

For those districts with irrigation specialists on staff, on-farm evaluations could be part of the district's overall program, thus supplementing the efforts of other services or mobile labs. Mobile Lab Programs may already be available in your area – contact your local Resource Conservation District or Reclamation Area Office Water Conservation Specialist for more information. Agricultural consultants may also be able to perform this service for district customers.

El Dorado Water District has developed an on-site irrigation evaluation and in field soil moisture analysis programs. These are free programs offered to the farmers as part of the District’s water conservation effort. What started out as a part-time position has evolved into a full-time Irrigation Specialist position. In addition to the District staff, the District also hires summer intern to help with the program. Since its inception, the District has evaluated over 110 farms and has established 78 moisture monitoring stations on 39 farms. Many farmers are utilizing this information for their irrigation practices. Since most of the larger farmers cultivate several parcels, a single evaluation can have a positive impact on thousands of acres.

2. Timely field and crop-specific water use information to the water user

There are several substantial benefits of accounting for water deliveries by crop and field. A water user having knowledge of the deliveries has real-time information on their individual irrigation events and the total of all irrigation on each field throughout the season. Comparison of per acre water usage of each crop by field within the district provides very meaningful water use information both to the water user and the district. Crop-specific and field-specific data allows development of a tiered water pricing system that is sensitive to crop type. It also provides accurate data for measuring the results of BMPs.

The district can prepare an annual report that summarizes water use by crop and by field, computes the unit water use per acre, and sorts these data in several ways-by water user, field number, crop type, and unit water use. This report allows the water users to compare their crops' specific water use with others within the district. At the end of each year, these reports can either be mailed to district customers or posted at the district office.

These reports will also be the best source of information to identify anomalies in water use that are indicators of possible sources of excessive tailwater and deep percolation or inaccurate metering.

b. Normal year and real-time irrigation scheduling and crop ET information (i.e., CIMIS).

Describe the district's irrigation scheduling assistance program, including methods of data dissemination, and list any cooperating agencies.

ET calculations and irrigation scheduling information is available from the DWR CIMIS network (at no charge) and the USBR Agrimet website at www.usbr.gov/pn/agrimet and from other irrigation service providers. Contractors will have to establish a program to disseminate the data collected at these stations (web site, newspapers, television, radio, telephone, e-mail, newsletter, etc.).

To assist growers to develop crop irrigation schedules, districts can establish programs to:

- Disseminate the data to interested district customers
- Provide technical assistance and instruction on scheduling techniques

Crop water need includes crop ET and water used for leaching and cultural practices. One good resource is available at http://www.fao.org/docrep/X0490E/X0490E00.htm. This report provides detailed information on calculating crop water requirements. Another report prepared by the Irrigation and Training Research Center (ITRC) at Cal Poly. *California Crop and Soil Evapotranspiration* can be accessed at http://www.itrc.org/reports/californiacrop.htm. Another resource is the Center for Irrigation Technology's (CIT) Wateright web site at www.wateright.org.

Historical climatologic data can be used to develop normal year crop ET rates that can assist:

- Contractors to determine approximate quantities of water that may be requested during any particular growing season.

- Growers to estimate the growing season ET requirements of crops.

For assistance in developing training workshops and seminars in irrigation scheduling, districts can contact local offices of the UC Cooperative Extension Farm Advisors. Consultants are also available to assist in the development of training courses or to provide direct technical assistance.

Solano Irrigation District maintains the Solano Agricultural Water Conservation Committee's (AWCC) weather website and weather station network. The web site provides ET rates for use in irrigation scheduling. The free web site also provides daily, weekly, and historical weather data from nine weather stations located in Solano County, a link to the CIMIS website, and a crop irrigation report. A weather forecast is also available to growers at a cost of $10/month. The forecast targets Solano County, and includes pest models such as degree days, chilling hours, powdery mildew levels, peach twig borer/codling moth levels, and two-spotted spider mite levels. The web address is www.westernwx.com/sid.

c. Surface, ground, and drainage water quantity and quality data

Describe the district's surface, ground, and drainage water quality monitoring program; include methods of data dissemination and list any cooperating agencies.

If the district has water sources with a range of qualities that affects how much water is needed for leaching, providing water quality information to customers when sources change can assist them to use an appropriate amount of water. When the quality of delivered water changes, districts should inform customers so that they can make appropriate irrigation adjustments (for leaching, etc.). Workshops can be designed to assist growers to make the best use of this information.

d. Agricultural water management educational programs and materials for farmers, staff, and public (soil moisture and salinity monitoring; in-school awareness programs; Agwater software; efficient irrigation techniques, crop water budget, and other approaches; program delivery via workshops, seminars, newsletters, field days, and demonstrations, etc.).

Describe the district proposed or supported educational programs and their goals. Attach the materials used in these programs (Attachment I).

The district should either sponsor or conduct educational seminars/workshops for district farmers and staff. Examples of workshop topics include: Information on weather, crop ET, soil moisture holding capacity, crop characteristics, irrigation scheduling, and water-use planning. Input from customers, neighboring districts, consultants, irrigators, and other technical experts will be important when determining the content of these seminars/workshops.

Educational seminars/workshops can serve districts in several ways. They can be used to:

- Communicate the importance of implementing efficiency programs.
- Describe conservation procedures that can be utilized by customers.
- Provide a forum for growers, industrial users, and others to exchange ideas and

experiences. These meetings also provide districts an opportunity to exchange ideas.

Information included in the Plan should include:

- Name and description of each program
- Co-funders (if any) of each program
- Yearly participation targets

Various local, State, and Federal agencies (USDA's Agricultural Research Service, the UCCE, resource conservation districts, etc.) offer technical assistance and will work with the district to provide educational seminars and workshops to water users.

4. Pricing structure

Adopt a water pricing structure for district water users based at least in part on quantity delivered. Describe the proposed quantity-based water pricing structure and when it will become (or became) effective. Financial variables influence the way customers use water. For example, when agricultural customers pay for each AF of water received, they are more likely to order an amount closer to the actual crop water need. Ordering only what is needed can reduce demand on distribution system capacity, reduce tailwater, and increase supply reliability.

5. Evaluate and improve efficiencies of district's pumps

Describe the pump efficiency evaluation program and the role of the district and participating local utilities in the program.

Many districts operate booster pumps or groundwater pumps as part of their delivery and spill recovery facilities. A program to evaluate and improve the efficiencies of such pumps may result in energy savings and peak load reductions, or reveal capacity limitations due to inefficient facilities. Over the long term, the district may be able to reduce operational costs and improve operational efficiency.

Provide information in the Plan on the district's pump testing program. Contact your local energy utility to determine if they offer pump-testing programs that can assist districts to minimize power costs.

Solano Irrigation District maintains an active pump testing program to monitor pump performance and determine repairs required to maximize pump efficiencies, minimize power consumption and enable managers to plan preventative maintenance procedures. The annual budget for the pump rehabilitation and maintenance is $100,000, and the annual budget for pump efficiency testing is $7,500. The testing program has allowed staff to establish baseline performance standards for most of the District's pumps. The District also participates in the California Agricultural Pump Efficiency Program (APEP), which manages a rebate program with PG&E for pump tests and pump repairs for grower owned pumps.

Westlands tested 354 of its pumps in 2006. The District's pumps range in size from 15 Hp to

700 Hp and are on a triennial testing program. Overhauls are scheduled when pumps test out at less than 60% efficiency threshold. Of those tested, the District overhauled 35 pumps that fell below the 60% efficiency threshold.

B. Exemptible BMPs for Agricultural Contractors

Agricultural districts should implement the following BMPs unless the district demonstrates that the practice is not appropriate. Refer to exemption process in Addendum B. Some districts may spend time studying the most effective way to implement a BMP or conduct a pilot study to determine if a BMP is appropriate for that district. For appropriate BMPs, provide a description of the implementation plan and include time schedules, budgets, and monitoring plans. If a BMP is to be studied, or a pilot study conducted, provide details and schedules of the study. These studies must be completed expeditiously and before the next Plan revision. The contractor is required to follow the exemption process (see Addendum A) to justify exemptions. Refer to, Addendum B for example justifications for each exemptible BMP. Document the exemption in this section. Some Exemptible BMPs may not apply to the district. See The purpose of preparing a Plan is for the district to implement the BMP programs developed during the planning process. Each year, districts report on the previous years actual BMP activities, budget, and staffing. They also project expenditures and staffing levels for the coming year and provide information on planned activities.

Contractors should maintain regular records of BMP implementation activities to facilitate the completion of the annual update. The BMP records can be tracked in a variety of ways. Some methods are: conservation staff recording data by BMP on their time sheets, weekly schedules, and special BMP budget computer codes.

1. Facilitate alternative land use

Facilitate alternative uses (voluntary or compensated) for lands with exceptionally poor production potential or whose irrigation contributes to significant problems (such as drainage).

This BMP applies only to districts that have irrigated lands with the following characteristics:

- High water table (<5 feet)
- Poor drainage
- Groundwater selenium concentration > 50 ppb
- Poor productivity

If a district does provide water to lands that have the above characteristics, describe the district program that will promote a voluntary, compensated change of use for those lands.

The decision to retire land usually includes other factors, such as alternative land use demand. Also, it may not preclude the option of reestablishing irrigated agriculture, if circumstances should change.

In response to ongoing water supply allocation shortages, Del Puerto Water District facilitated an effort with landowners to permanently retire less productive lands in order to utilize the water supply in more productive areas. Alternative uses on these retired lands currently includes dry land farming, grazing, and/or habitat mitigation. In addition to this permanent program, annual

efforts of a similar nature are undertaken by growers who seek to utilize their limited surface supplies on the most productive land available while temporarily fallowing any lands that may be less productive.

2. Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils

The use of recycled urban wastewater for agricultural irrigation provides an opportunity for use of an available water supply. Reuse of urban wastewater can be an important element in overall water management.

Identify the source of recycled water and the yearly quantity that is available. Provide the cost of the recycled water and describe its quality in relation to the crops the water will irrigate. Describe the program that will promote the use of the recycled water by agricultural customers and identify the district role in the program.

Solano Irrigation District utilizes recycled water from the Fairfield Wastewater Treatment Plant to meet all the irrigation needs for the turf nursery located near the treatment plant. Currently, this is the only farm located in the vicinity of a treatment plant that is producing a nonconsumable crop.

Del Puerto Water District is currently pursuing a feasibility study on the use of recycled water produced by the cities of Modesto and Turlock. This study will identify and evaluate any legal and institutional issues associated with the proposed project, analyze alternatives, identify a recommended delivery system, identify all environmental, permitting, design, construction, operations, maintenance, and financing requirements, as well as determine the approximate costs and assess the financial feasibility of the project.

3. Facilitate the financing of capital improvements for on-farm irrigation systems

Identify district programs to facilitate and/or provide financial incentives for improved on-farm water management. Include information on the estimated amount of yearly financial assistance. Attach the funding information the district provided to water users.

Facilitating financial aid to farmers may include cataloging available funding sources and procedures or obtaining funding and administering the program or providing low-interest loans.

Often a grower can greatly improve water management if financing is available. For some growers, the ability to implement efficient management practices and install modern irrigation systems is hampered by the lack of capital. These individuals are willing to improve efficiency if long-term affordable financing is available.

Westlands Water District offers the Expanded Irrigation System Improvement Program (EISIP)/Grant to District farmers and landowners farming drainage impaired lands. This program provides low interest rates to farmers for the lease-purchase of irrigation system

equipment, and is supplemented by Reclamation grant funding. The grant offers eligible water users funding up to $65,000 or 50% of the total lease purchase, whichever is less, towards the purchase of irrigation system equipment. The EISIP/Grant continues to maintain the $130,000 purchase maximum. Eligible equipment includes: portable aluminum irrigation equipment and other improved irrigation systems, including but not limited to micro irrigation, linear move and center pivots. For an example of a successful cost share program for the purchase of new irrigation system equipment, go to www.westlandswater.org.

Del Puerto Water District currently facilitates landowner water management best practices by promoting and coordinating a low interest loan programs whereby customers can purchase and install high-efficiency irrigation and/or drainage return systems. The recently finalized SRF Loan program funded 81 projects throughout the District, funding the installation of $4 million worth of drip, micro, and sprinkler systems. This program was replaced in 2007 by the Agricultural Drain Loan Program, which thus far has funded 31 projects worth over $3.3 million.

4. Incentive pricing

Implement a pricing structure that promotes one or more of the following goals:

- Encourages more efficient water use at the farm level
- Supports planned conjunctive use of groundwater
- Increases groundwater recharge
- Reduces problem drainage
- Improves management of environmental resources

Describe the incentive pricing structures that were considered, which were selected for implementation, and when it will become effective. Incentive pricing structures, such as increasing block rates, are those that encourage appropriate water use. Incentive rates encourage customers to accurately determine and apply only the water a crop needs, thus reducing over-irrigation and the resulting drainage.

Examples and explanations of agricultural rate schedules can be found in *Incentive Pricing Handbook for Agricultural Water Districts* available from your Reclamation area office or at www.usbr.gov/pmts/economics/reports/Pricing%20Handbook.pdf. Also see Incentive Pricing Best Management Practice for Agricultural Irrigation Districts on the Planner CD or at www.usbr.gov/mp/watershare/documents/files/managementplanning/incentive_pricing.pdf.

Several districts have implemented incentive pricing structures for irrigation water and drainage water disposal. Because of area specific management needs (such as leaching requirements, potential supply shortages, crop types, and soil and climatologic conditions) districts incentive rate designs will vary.

Panoche Water District has in place a tiered water pricing system to promote water conservation. There are a pre-irrigation tier and seasonal tiers. The pre-irrigation tier is set at 9 inches of water. The grower is charged twice the rate for water used over the tier. The seasonal tiers are applied to all water delivered above the CVP allocation. This system is an incentive for

increased on-farm water use efficiency, reducing deep percolation and the consequential drainage component that must be managed by the District.

5a. Line or pipe ditches and canals

Line or pipe the distribution system to increase distribution system flexibility and capacity and decrease maintenance and seepage. Describe the program to line or pipe the distribution system reaches with the greatest loss per foot or those reaches that have the greatest negative impact on delivery flexibility and capacity. As water cost or demands increase, it will become cost effective to line/pipe more sections of the distribution system.

Seepage and evaporation losses in earthen canals and laterals can be minimized by replacement with pipelines or lining with bentonite clay, pour-in-place concrete or plastics/textile membranes. To reduce on-farm seepage losses, districts may wish to consider helping growers to line their ditches or install pipelines.

In 2007, Pelger Mutual Water Company received a Reclamation grant to line approximately 5,280 feet of a sandy loam, earthen canal with a nonporous geomembrane liner. The canal was experiencing water losses due to transpiration through vegetation along the canal bed, seepage, and soil erosion. Based on pre-project and post-project ponding tests, Pelger Mutual Water Company estimates that lining this section of canal saves 300 acre feet of water per year. In addition to conserving water, the project provides other benefits such as improved conveyance, energy savings from reduced pumping costs, weed control and reduced pesticide applications, rodent control, and labor savings.

5b. Regulatory reservoirs

Construct regulatory reservoirs to improve distribution system delivery flexibility. The construction and/or lining of regulatory reservoirs can provide improved system operation and distribution flexibility, additional supply storage, reduced operational losses, and increased flexibility in the reception of surface and/or aqueduct supplies.

Imperial Irrigation District constructed six regulatory reservoirs as part of its program to improve the operation efficiency of its distribution system. Although the combined storage capacity of these reservoirs is only approximately 2,300 AF, some of the more significant benefits of the reservoirs include:

- Storing water normally held with less efficiency in the district's canals and laterals or released to the Salton Sea (when growers are unable to use ordered water due to unexpected rainfall).
- The ability to meet customer water delivery requests
- Increased distribution system operational efficiency

Tranquillity Irrigation District is planning to investigate the feasibility of a reservoir ("Railroad Reservoir") on Tranquillity Irrigation District owned property located in Fresno Slough Water District for the purpose of regulation, storage of high flows off of the Kings River, and

temporary storage of groundwater for flow peaking needs. Surplus high flows and off-peak flows would be able to be stored in the reservoir for future use. The reservoir would also reduce energy costs since stored groundwater would be pumped into the reservoir during off-peak periods (nights and weekends). It is estimated that the proposed reservoir will be about 300 acre-feet in size and could be filled and emptied 3 times per year for a total 900 acre-feet of storage in a year.

James Irrigation District investigated the feasibility of using the distribution canal to the existing Lateral K Recharge Basin as a regulatory reservoir. In 2007, the District completed the design and construction to modify the turnout to the Lateral K recharge basin site so that the delivery canal and smallest cell could be used as regulation reservoir as well as provide spill protection for the Main Canal. The project resulted in a combined storage increase of approximately 90 acre-feet.

6. Increase flexibility (within operational limits) in water ordering by, and delivery to, water users

Modify distribution facilities and controls to increase the reliability, consistency, and flexibility of water deliveries. Describe measures you plan to implement to change from a rotation to an on-demand delivery system, and improve delivery flexibility and system capacity. Describe measures you plan to implement to increase delivery flexibility available to farmers, and describe obstacles for further flexibility improvements.

Many factors influence the effectiveness of irrigation. Among these are soil texture and uniformity, surface gradient, length of irrigation run, weed growth, debris from previous plant growth, irrigation water quality, root zone soil chemistry, depth of the unsaturated zone, wind velocity, humidity, air temperature, grower's expertise, and the design, condition, and operation of the irrigation system.

If all of the above factors are optimum, but the irrigation water is not available at the necessary time or in the appropriate quantities, irrigation effectiveness will be adversely affected. Weather unpredictability often does not allow a grower sufficient lead time to order water. Unlike urban water systems, agricultural districts often do not have systems that can provide water on demand.

Increased flexibility allows growers to irrigate only when necessary, but growers must be sure that the water will be there when needed.

Provide a copy of a water order form (Attachment J).

In 2001, Delano-Earlimart Irrigation District (DEID) began working with the Irrigation Training and Research Center (ITRC) at Cal Poly, San Luis Obispo on a research project to evaluate how a new turnout design could be modified to address water hammer concerns, provide for greater stability in ordered flow rate at each turnout, and move the District toward a "grower-demand" operating model. After a number of prototypes and extensive field testing, the ITRC developed the "DEID float valve assembly system." The float valve assembly system includes a frame, float, guide for the float valve linkage and a butter fly valve. The system also requires the grower to install his/her own operating valve on the downstream side of the District.

The system has proved very popular with DEID growers since it allows growers to turn water service on and off without having to wait for the availability of District personnel. In addition, growers experienced immediate water and energy savings since they are able to curtail their irrigation sets. Water and energy savings also accrue to the District. An annual water savings of 20,000 acre-feet have been estimated in a normal water year.

7. Construct and operate district spill and tailwater recovery systems

Construct facilities to capture and reuse district operational spills. The design and operation of a district's conveyance system has a significant role in the quantity of annual operational spills. A district should measure the annual spill from each canal and determine the percentage that could be captured for beneficial use. This data is essential to correctly site and size spill and tailwater recovery systems.

Interceptor systems can be designed to capture and transport operational spills throughout a conveyance system. One design adds lateral-connector canals. In this design, a secondary canal is constructed at the terminus point of a series of laterals to capture operational spill. The system is designed to either pump spills back into the laterals or transport them to a reservoir for storage.

Fresno Irrigation District has installed a new regulating structure for controlling spills during late fall and winter and occasionally during the irrigation season. The structure enhances the District's capabilities to distribute storm and nuisance flows between the Herndon and Dry Creek systems. Previously this water flowed down the Herndon Canal and only a small portion was captured downstream before leaving the District. Along with keeping the Herndon Canal dry when maintenance or construction is occurring downstream, the spill structure helps maximize the flows to three of the district's banking facilities.

8. Plan to measure outflow

Measure the volume outflow with methods or devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 20 percent by volume. Identify spill locations, prioritize spill locations by quantity of spill, and determine best measurement method/cost. If outflow measurement has not yet been completed, submit funding proposal, and provide the estimated cost and milestone schedule.

9. Optimize conjunctive use of surface and groundwater

Increase planned conjunctive use of surface and groundwater within the district. Describe the potential for increased conjunctive use and identify programs to achieve this potential. If feasible, districts should prepare and implement long-range plans to conjunctively use surface water and groundwater to meet current and future demands. Conjunctive use programs store surplus imported and local surface water in groundwater basins. When surface water is inadequate to meet demand, groundwater can then be pumped and distributed.

Arvin-Edison Water Storage District has had an active conjunctive use program since 1966. In

order to regulate a highly variable water supply AEWSD develops water management programs based on the concept of delivering imported water in years of above average water supplies to 1) spreading ponds for groundwater recharge or, 2) transfers and exchanges water to other agencies that can in turn provide return water in subsequent years. During below average or dry years, AEWSD extracts previously stored groundwater and/or accepts return of water from water transfers and exchanges to meet its agricultural demands when surface supplies are adequate. AEWSD maintains various spreading basins to percolate water in to the aquifer for storage. Gravity and pressure feed ponds (totaling approximately 1,500 acres) are filled from surface water supplies in "wet" years, while groundwater wells (76 District owned) are used to extract stored water in "dry" years to meet surface water service demands. As of 2011, the District stored approximately 2 million AF of water in the groundwater basin underlying AEWSD. Historically, AEWSD has also used its idle facilities to generate water management benefits for other water agencies.

10. Automate distribution and/or drainage system structures

Automation of distribution and/or drainage system structures may increase flexibility in water deliveries and increase district control over its water supplies, thereby providing the opportunity to improve the efficiency of water use.

Identify locations for automated distribution structures and other distribution or drainage system improvements. Estimate annual water savings (AF/Y) resulting from the evaluated projects. Describe program to automate distribution or distribution system.

Patterson Irrigation District continues to maintain its existing automated facilities which utilize supervisory control and data acquisition (SCADA) to monitor and control its main canal and reservoir projects based on level and flow demands. Additionally, PID continues to incorporate automation in new capital improvement projects implemented within the district. For example, the District's 2008 pipeline project included automation of two of the District's laterals and the District's main canal system. The lateral automation included transducers, a rectangular orifice gate, actuators, and radio equipment to remotely control and regulate deliveries on the District's 5-South and M-Laterals. Additionally, automation and controls on four of the five pump stations lifts on the District's main canal were calibrated and improved to incorporate a 35 cfs pump station, and five new pumps operating with variable frequency drives.

11. Facilitate or promote water user pump testing and evaluation

Describe the program to facilitate or promote customer pump testing and evaluation. State the number of pumps to be evaluated annually. Attach the materials used in these programs (Attachment I). A district and the local utility can develop a cooperative pump testing service program for their customers. The program will benefit all involved parties by cutting down on energy demand while providing groundwater or pressurized low-volume systems at the lowest possible price.

Pacific Gas and Electric is partnering with the Center for Irrigation Technology at Fresno State University on the Advanced Pump Efficiency Program. The program provides $200 for

evaluating pumps that have not been tested in the last four years and $100 per pump if it has not been tested in the last two years. More information on this program is located at: www.pumpefficiency.org.

Westlands Water District, in addition to testing approximately 1,000 District meters annually, the District also tests and calibrates an additional 250 meters installed by farmers on well discharges in conjunction with Westlands' Pumped Groundwater Exchange and Groundwater Integration Programs. However, operation and maintenance of all wells is the farmers' responsibility. Conjunctive use programs such as this one maximize the use of farmers' groundwater wells during drought periods.

12. Mapping

Develop Geographic Information System (GIS) maps of the district's distribution system and drainage system. A GIS is a system designed to capture, integrate, store, manipulate, analyze, manage and present of all types of geographically referenced data for informing decision making. A comprehensive GIS database should include GPS locations of district facilities, inflow/outflow points, conveyance system, etc. as well as base datasets such as soils and hydrography. If digital mapping has not yet been completed, include the estimated cost and milestone schedule for implementing this BMP.

Glenn Colusa Irrigation District (GCID) has been using a GIS for District service area mapping and land use inventory for the past 15 years. The development of GCID's GIS evolved out of a need to analyze an increasingly wide scope of data and to present and communicate that data both visually and in summary. The foundation of the District's GIS is an orthorectified digital aerial photo base map of the entire District service area. The gathering of field data involves the collection of reference coordinates using a hand held Trimble GPS unit. The data is then downloaded into the GIS and can used along with other databases, spreadsheets, and polygons. The field data polygons created based on the data collected by the GPS can then be mapped and layered over the base map. Digital pictures can also be obtained at the site and later linked to the spatial data. The GIS provides a platform for the integration of information with ongoing operation and maintenance of District facilities as well as for the planning and design for future improvements and for other projects where a GIS can be a valuable tool. GCID currently uses Arc GIS 9.2 software.

The following is a list of the various capabilities of the District's GIS:

- Inventory of the water distribution and drainage system, including conduits, structures. and water delivery and recapture facilities
- Land ownerships and assessed acreages
- Field parcel identification numbers, acreages and crops
- Water Operator Service Areas and Lateral Service Areas
- Water applications and accounting
- Soil and land use classification maps.
- Surface hydrology and sub-surface geology
- Regional and interregional planning and project mapping

- Assist landowners with mapping needs and requirements

GCID utilizes its GIS as a valuable decision making and management tool. It is used to visually display its distribution system and to efficiently organize data which facilitates operations and management decisions.

C. Provide a 3-year Budget for BMPs

(For the current year and for the 2 years following the Plan update for all BMPs in expenses, hours or both. Do not include maintenance costs.)

3-Year Budget Summary

1. Amount actually spent during current year

Year 2012 or Year 1		Budgeted Expenditure	
BMP #	BMP Name	(not including staff time)	Staff Hours
A1	Measurement	$0	0
2	Conservation staff	$0	0
3	On-farm evaluations/water delivery info	$0	0
	Irrigation scheduling	$0	0
	Water quality	$0	0
	Agricultural education program	$0	0
4	Quantity pricing	$0	0
5	Contractor's pumps	$0	0
B1	Alternative land use	$0	0
2	Urban recycled water use	$0	0
3	Financing of on-farm improvements	$0	0
4	Incentive pricing	$0	0
5	Line or pipe canals/install reservoirs	$0	0
6	Increase delivery flexibility	$0	0
7	District spill/tailwater recovery systems	$0	0
8	Measure outflow	$0	0
9	Optimize conjunctive use	$0	0
10	Automate canal structures	$0	0
11	Customer pump testing	$0	0
12	Mapping	$0	0
	Total	$0	0

2. Projected budget summary for the next year

Year 2013 or Year 2		Budgeted Expenditure	
BMP #	BMP Name	(not including staff time)	Staff Hours
A1	Measurement	$0	0
2	Conservation staff	$0	0
3	On-farm evaluations/water delivery info	$0	0
	Irrigation scheduling	$0	0
	Water quality	$0	0
	Agricultural education program	$0	0
4	Quantity pricing	$0	0
5	Contractor's pumps	$0	0

B1	Alternative land use	$0	0
2	Urban recycled water use	$0	0
3	Financing of on-farm improvements	$0	0
4	Incentive pricing	$0	0
5	Line or pipe canals/install reservoirs	$0	0
6	Increase delivery flexibility	$0	0
7	District spill/tailwater recovery systems	$0	0
8	Measure outflow	$0	0
9	Optimize conjunctive use	$0	0
10	Automate canal structures	$0	0
11	Customer pump testing	$0	0
12	Mapping	$0	0
	Total	$0	0

3. Projected budget summary for 3rd year.

Year 2014 or Year 3		Budgeted Expenditure	
BMP #	BMP Name	(not including staff time)	Staff Hours
A1	Measurement	$0	0
2	Conservation staff	$0	0
3	On-farm evaluations/water delivery info	$0	0
	Irrigation scheduling	$0	0
	Water quality	$0	0
	Agricultural education program	$0	0
4	Quantity pricing	$0	0
5	Contractor's pumps	$0	0

		Budgeted Expenditure	
BMP #	BMP Name	(not including staff time)	Staff Hours
B1	Alternative land use	$0	0
2	Urban recycled water use	$0	0
3	Financing of on-farm improvements	$0	0
4	Incentive pricing	$0	0
5	Line or pipe canals/install reservoirs	$0	0
6	Increase delivery flexibility	$0	0
7	District spill/tailwater recovery systems	$0	0
8	Measure outflow	$0	0
9	Optimize conjunctive use	$0	0
10	Automate canal structures	$0	0
11	Customer pump testing	$0	0
12	Mapping	$0	0
	Total	$0	0

Section IV: BMPs for Urban Contractors

Any Contractor that annually provides 2,000 AF of municipal and industrial water or more is required to complete this section. Any Contractor receiving 2,000 AF or more for a combination of municipal and industrial, and agricultural purposes is required to submit an urban water management plan.

If a primarily Urban Contractor provides some Agricultural Water, they are required to include Agricultural BMP 1 (Water Measurement) and BMP 4 (Pricing Structure) in their plan.

Once a Contractor provides water to 2,000 farmed acres or more they are required to address all the BMPs in Section III, BMPs for Agricultural Contractors.

The BMPs listed below will be evaluated based on the CUWCC's current MOU Exhibit 1, amended September 16, 2009 (BMP Definitions, Schedules, and Requirements). Please check the CUWCC website (www.cuwcc.org) to verify that this is the current version. The CUWCC MOU lays out requirements for implementation, coverage, and documentation. Required coverage is determined based on annual reports submitted to the CUWCC. The CUWCC analyzes data and sends coverage reports to the contractor. As of November 2011, the CUWCC has been in the process of updating their BMP reporting website. Interactive PDFs have been developed for submitting data in the interim. They are available on the CUWCC website.

A. BMP Definitions, Schedules, and Requirements
Updated June 9, 2010

The Council's 14 BMPs are now organized into five categories. Two categories, Utility Operations and Education, are "Foundational BMPs", because they are considered to be essential water conservation activities by any utility and are adopted for implementation by all signatories to the MOU as ongoing practices with no time limits. The remaining BMPs are "Programmatic BMPs" and are organized into Residential, Commercial, Industrial, and Institutional (CII), and Landscape categories. The minimal activities required of each signatory are encompassed within each list, except for activities from which a utility is exempt from completing under section IV.5 of the MOU and for which the utility has filed an exemption with the Council.

BMP Naming Changes
The following table provides the new BMP categories as revised on June 9, 2010.

Old BMP Number & Name	New BMP category
1. Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers	Programmatic: Residential
2. Residential Plumbing Retrofit	Programmatic: Residential
3. System Water Audits, Leak Detection and Repair	Foundational: Utility Operations – Water Loss Control
4. Metering with Commodity Rates for All New	Foundational: Utility Operations –

Connections and Retrofit of Existing Connections	Metering
5. Large Landscape Conservation Programs and Incentives	Programmatic: Landscape
6. High-Efficiency Clothes Washing Machine Financial Incentive Programs	Programmatic: Residential
7. Public Information Programs	Foundational: Education – Public Information Programs
8. School Education Programs	Foundational: Education – School Education Programs
9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	Programmatic: Commercial, Industrial, and Institutional
10. Wholesale Agency Assistance Programs	Foundational: Utility Operations – Operations
11. Retail Conservation Pricing	Foundational: Utility Operations – Pricing
12. Conservation Coordinator	Foundational: Utility Operations – Operations
13. Water Waste Prohibition	Foundational: Utility Operations – Operations
14. Residential ULFT Replacement Programs	Programmatic: Residential

BMP, Flex Track and Gallons per Capita per Day Options

Compliance with the BMP water savings goals can be accomplished in one of three ways including: accomplishing the specific measures as listed in Section A of each BMP; accomplishing a set of measures which achieves equal or greater water savings, referred to in the CUWCC MOU document as the Flex Track Menu; and accomplishing set water savings goals as measured in gallons per capita per day consumption. A CUWCC signatory may elect to adopt additional or alternative measures, in part or in any combination, as described in the Flex Track Menus, provided that the demonstrated water savings in the Flex Track Menu activities are equal to or greater than the water savings that would be achieved by the BMP measures.

A CUWCC signatory may elect to adopt additional or alternative measures, in part or in any combination, as described in the Flex Track Menus provided that the demonstrated water savings in the Flex Track Menu activities are equal to or greater than the water savings that would be achieved by the BMP measures.

“Demonstrated water savings” represent unit water savings for individual BMP or Flex Track Menu conservation technologies and activities as established by either: (a) a water utility; (b) independent research studies; or (c) CUWCC- adopted savings as reviewed by the Research and Evaluation Committee and approved by the Steering Committee.

Another alternative method to satisfying the BMP requirements is “GPCD (gallons per capita per day) Compliance”. Agencies which choose a GPCD Compliance approach will be counting overall water savings of the quantifiable measures from the BMP list or Flex Track Menu plus

additional savings achieved through implementation of the Foundational BMPs. Savings goals and methodology will be updated in the CUWCC MOU Compliance Policies from time to time based upon data and studies.

Exhibit 1of the CUWCC MOU lists BMPs that urban contractors may implement. Refer to the CUWCC 2010 MOU for more information on the compliance options. Provide a description of which compliance option will be implemented (BMP list, Flex Track, or GPCD). Describe how the BMP is being implemented and include time schedules, budgets and monitoring, and maintenance data for each BMP. The contractor must include the current year actual expenditures and a projected budget for the cost of implementing the BMPs for the three years following the Plan update.

Contractors who are wholesalers must insure that their retailers have Plans that meet the Criteria. Wholesalers may include their retail water districts in a single Plan or require each retailer to prepare a separate Plan. If retailers prepare their own Plans, the wholesaler should be involved to the extent necessary to insure all Plans meet the Criteria.

The purpose of preparing a Plan is for the Contractor to implement the BMP water efficiency programs. Each year, Contractors report on actual BMP activities during the previous year. Contractors should maintain records of BMP implementation activities to facilitate the completion of the Annual Update. The BMP records can be tracked in a variety of ways. Some methods are: conservation staff recording BMP data on their time sheets, weekly schedules, and special budget BMP computer codes.

The BMPs are intended to reduce long-term urban demands and improve water management in an effort to maximize the limited water resources available. These BMPs are in addition to programs that may be instituted during water supply shortages.

Note: Annual reporting is completed on the Internet at http://www.cuwcc.org/.

B. Provide a 3-year Budget for BMPs

(For the current year and for the 2 years following the Plan update for all BMPs in expenses, hours or both. Do not include maintenance costs.)

1. Amount actually spent during current year

Year 2012 or Year 1 BMP #	BMP Name	Projected Expenditures (not including staff hours)	Staff Hours
1.	Utilities Operations		
1.1	Operations Practices	$0	0
1.2	Water Loss Control	$0	0
1.3	Metering	$0	0
1.4	Pricing	$0	0
2.	Education		
2.1	Public Information Programs	$0	0
2.2	School Education	$0	0
3.	Residential	$0	0
4.	CII	$0	0
5.	Landscape	$0	0
	Total	$0	0

2. Projected budget summary for the next year

Year 2013 or Year 2 BMP #	BMP Name	Projected Expenditures (not including staff hours)	Staff Hours
1.	Utilities Operations		
1.1	Operations Practices	$0	0
1.2	Water Loss Control	$0	0
1.3	Metering	$0	0
1.4	Pricing	$0	0
2.	Education		
2.1	Public Information Programs	$0	0
2.2	School Education	$0	0
3.	Residential	$0	0
4.	CII	$0	0
5.	Landscape	$0	0
	Total	$0	0

3. Projected budget summary for 3rd year.

Year 2014 or Year 3 BMP #	BMP Name	Projected Expenditures (not including staff hours)	Staff Hours
1.	Utilities Operations		
1.1	Operations Practices	$0	0
1.2	Water Loss Control	$0	0
1.3	Metering	$0	0
1.4	Pricing	$0	0
2.	Education		
2.1	Public Information Programs	$0	0
2.2	School Education	$0	0
3.	Residential	$0	0
4.	CII	$0	0
5.	Landscape	$0	0
	Total	$0	0

Addendum A

Exemption Process

Intent: To demonstrate in a clear and concise manner that a BMP is not cost-effective, not financially feasible, and not legally or environmentally possible for a contractor to implement. Only the BMPs in section III.B. are exemptible for agricultural contractors. For urban contractors, **all BMPs are** exemptible except for Foundational BMP 1.3.

Evaluation: Some BMPs are not appropriate or possible for a contractor to implement. To document an exemption, the basis, rationale, and details for excluding a BMP must be provided. Such documentation must address, as appropriate, cost-effectiveness, financial feasibility, and environmental or legal constraints to BMP implementation. Urban BMP exemption requests should use the CUWCC exemption process. All urban and agricultural exemption requests will be reviewed for completeness, accuracy, and appropriateness by either Reclamation or an independent contractor.

Detail Expected in an Adequate BMP Exemption

Legal Constraints - Due to legal constraints, the following must be detailed in order to justify a BMP exemption:

1. A list of any known laws, regulations, court decisions, or other legal constraints that make it illegal for the contractor to implement the BMP.
2. A list of the steps required to remove these constraints.
3. A description of what steps the contractor has taken to remove these constraints.
4. Documentation of efforts by the contractor to work with other entities that have the legal authority to carry out the BMP within the contractor's service area.

Environmental Constraints - In order to justify an exemption due to known adverse environmental impacts, the Plan must document critical environmental issues and known (qualitative and/or quantitative) negative impacts of the BMP, and an explanation of why effective mitigation of these impacts is not possible. If mitigation of the environmental impacts is possible, the practice must be implemented unless it can be exempted by another exemption category. For example, if the mitigation costs make the project economically infeasible, a discussion of the mitigation plan and necessary mitigation costs should be included as part of the economic analysis.

Financial Constraints - In order to adequately justify an exemption due to financial constraints, the Plan must clearly document the following:

1. The contractor’s funding needed to implement the BMP.
2. A discussion regarding why the contractor cannot finance the BMP through rate adjustments, assessments, etc.
3. A discussion of the contractor's reasonable efforts to secure funding from other entities that include, but are not limited to, lending institutions and bonding authorities, and an explanation of why these entities would not provide funding.

4. The required amount of a grant or subsidy necessary to feasibly implement the BMP if financing or partnerships could not be obtained. A benefit-cost analysis that demonstrates the costs to the contractor outweigh the benefits to the contractor over the life of the measure. The contractor must perform the analysis by comparing the present value of all benefits to the present value of all costs.

   Document the projected/estimated benefits and costs and the methodology for analysis (benefits and costs should be quantified to the extent possible). The analysis performed for each excluded BMP (from the contractor's perspective) must include, but is not limited to, the following benefits and costs:

   Benefits

   a) All capital costs avoided by the contractor which include, but are not limited to, the costs associated with the development of new supplies (studies, construction, labor, etc.), transportation, the required increase in storage, distribution capacity, wastewater facilities and treatment capacity, etc.
   b) Operation and maintenance (O&M) costs associated with the decrease in the production and distribution of water or the treatment and disposal of wastewater that include, but are not limited to, energy, labor, treatment, storage, drainage treatment and disposal, etc.
   c) Water purchases avoided by the contractor.
   d) Environmental costs avoided by the contractor.
   e) Environmental enhancements.
   f) Revenues from other entities that include, but are not limited to, revenue from the sale of water made available by the BMP, financial incentives received from other entities, etc.
   g) Other benefits to the contractor customers that include, but are not limited to, hydropower, improved crop yields, improved crop quality, labor savings, fertilizer savings, increased farm income, etc.

   Costs

   a) Capital expenditures incurred by the contractor for implementation of the BMP that include, but are not limited to, equipment, supplies, materials, construction, etc.
   b) O&M costs to plan, design, implement, enforce, and evaluate the practice.
   c) Financial incentives to customers.
   d) Costs to the environment (describe the nature of the negative impact(s) and potential losses to the environment).
   e) Other costs to the contractor.

   Several accepted benefit-cost analysis methodologies exist (e.g., California Energy Commission's Integrated Resource Planning Methodology, Generally Accepted Accounting Principles, AWMC's Net Benefit Analysis, etc.). A contractor is considered to be the best suited to evaluate their own economic situation with an appropriate methodology.

A discussion and quantification, to the extent possible, of other benefits associated with the implementation of the BMP that may be of interest to potential partners, but are not the direct, sole responsibility of the contractor.

Addendum B

Exemptible BMPs for Agricultural Contractors

To establish that a BMP is not applicable (NA) to the contractor, the Plan should explain why the BMP does not apply to the contractor. This justification must be consistent with Section I: Description of the District. Example justifications for each exemptible BMP are listed below. This list is not all inclusive.

Exemptible BMPs for Agricultural Contractors

1. *Facilitate alternative land use* - NA could include contractors without irrigable lands that have exceptionally high water duties or whose irrigation does not contribute to significant problems.

2. *Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils* - NA could include no recycled water sources available.

3. *Facilitate the financing of capital improvements for on-farm irrigation systems* - None identified.

4. *Incentive pricing* – NA could include contractor receives Class 2 water only.

5. *Canal lining/piping and regulatory reservoirs* - NA could include completely piped systems, unlined canal systems, sections which are used as part of a planned conjunctive use program, or completely piped systems that do not have delivery constraints.

6. *Increase flexibility in water ordering by, and delivery to, the water users within operational limits* - None identified.

7. *Construct and operate contractor spill and tailwater recovery systems* - NA could include completely piped systems that do not have delivery constraints.

8. Plan to measure outflow - NA could include no spill or tailwater leaves the district.

9. *Optimize conjunctive use* - NA could include contractors who do not overlie a useable groundwater basin and thus neither the contractor nor their customers pump or use ground water, and the contractor has no water supplies other than the contract supply.

10. *Automate canal structures* - NA could include completely piped systems which do not have delivery constraints.

11. *Facilitate or promote water user pump testing and evaluation* - NA could include districts that have no groundwater, lift or diversion pumps.

12. *Mapping* - None identified

Addendum C

Information Required of Contractors Located in a Drainage Problem Area

Contractor's included in the drainage problem area, as identified in "A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley" (September 1990), are listed by subarea below. If future editions of the drainage report revise the boundaries of a drainage problem area or other factors used to determine which districts are in a drainage problem area, Reclamation will revise this Addendum to conform with the current drainage report.

1. Reclamation districts in the **Grasslands subarea**: Central California Irrigation District, Del Puerto Water District, Firebaugh Canal Water District, Mercy Springs Water District, Pacheco Water District, Panoche Water District, San Luis Canal Company, and San Luis Water District.

2. Reclamation districts in the **Westlands subarea**: James Irrigation District, Tranquillity Irrigation District, and Westlands Water District.

3. Reclamation districts in the **Tulare subarea**: Alpaugh Irrigation District, Atwell Island Water District, Lower Tule River Irrigation District, and Pixley Irrigation District.

4. Reclamation districts in the **Kern subarea**: Alpaugh Irrigation District.

Contractors listed above shall describe which recommendations prescribed in "A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley" (September 1990) have been incorporated in their water conservation programs to improve conditions in drainage problem areas. These recommendations include:

1. Source control
2. Land retirement
3. Drainage water treatment
4. Drainage water reuse
5. Shallow groundwater pumping
6. Evaporation ponds

Provide a description and level of expenditure for each activity designed to address the recommendations of the San Joaquin Valley Drainage Program. Identify how implementation of the recommendations has or will substantially reduce deep percolation on drainage problem lands. Describe which recommendations have not been implemented and why. Include a copy of the Drainage Problem Area Report as Attachment K.

Addendum D

Crop List

barley
corn - field
oats
rice
sorghum
wheat
other cereals

alfalfa
irrigated pasture
other hay
silage
other forage

cotton
safflower
sugar beets
soybeans
other field crops

asparagus
beans
broccoli
cabbage
carrots
cauliflower
celery
corn
cucumbers
garlic
greens
lettuce
melons
onions
peas
peppers
potatoes
squash
tomatoes
other vegetables

grasses

apples
apricots
avocados
berries (all kinds)
cherries
grapefruit
lemon / limes
oranges / tangerines
dates
grapes
olives
peaches
pears
prunes / plums
strawberries
other fruits

almonds
pecans
pistachios
walnuts
other nut trees

other